

THE BACTERIA

A TREATISE ON STRUCTURE AND FUNCTION

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Dr. Joshua Lederberg,
Department of Genetics,
University of Wisconsin,
Madison 6, Wisconsin.

Dear Joshua:

A statement of purpose and two copies of a proposed outline are enclosed to solicit your aid.

Before inviting qualified investigators to contribute in assembling, in available form, the accumulated data on micro-organisms for the use of students and research workers, we should very much appreciate your criticism of the proposed outline and suggestions for its improvement. If you would jot your initial reactions on one of the copies of the outline and return it in the enclosed envelope, it would be very helpful to our planning. We shall, of course, appreciate your writing your more considered opinions at a later time, retaining the second copy of the outline for this purpose.

We anticipate getting underway with the first volume rather promptly and would very much appreciate your counsel and aid.

Yours very truly,



I. C. Gunsalus

R. Y. Stanier

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THE BACTERIA

A Treatise on Structure and Function

Volume I

Physiology, Structure, Genetics

Introduction

Part I: Physiology

Chapter

- 1 Energy Sources: Fermentation
- 2 Energy Sources: Respiration
- 3 Energy Sources: Electron Transport Systems
- 4 Energy Sources: Photosynthesis
- 5 Biosynthesis: Amino Acids
- 6 Biosynthesis: Purines and Pyrimidines
- 7 Biosynthesis: Proteins and Nucleic Acids
- 8 Biosynthesis: Vitamins and Coenzymes
- 9 Biosynthesis: Sugars and Polysaccharides
- 10 Growth: Quantitative Nutritional Requirements
- 11 Growth: The Lag and Exponential Phases
- 12 Growth: Stationary and Declining Phases
- 13 Ecology: The Enrichment Culture Method

Part II: Structure

- 14 Range of Construction and Organization
- 15 Internal Structure of the Vegetative Cell
- 16 Surface Layers and Their Function: Capsule
- 17 Surface Layers and Their Function: Cell Wall
- 18 Surface Layers and Their Function: Permeability
and Transport
- 19 Bacterial Movement: Flagellar and Gliding Movement
- The Endospore. See Vol. 3, Chapter 10

Part III: Genetics

- 20 Mutation
- 21 Selection
- 22 Recombination
- 23 Transformation and Transduction
- 24 Induced Enzyme Formation

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T H E B A C T E R I A

Volume II

True Bacteria: Gram-Negative Groups

Chapter

- 1 Pseudomonas and Vibrio
- 2 Acetobacter
- 3 Azotobacter
- 4 Rhizobium
- 5 Spirillum
- 6 Nitrifying Bacteria
- 7 Thiobacillus
- 8 Sulfate-Reducing Bacteria
- 9 Methane Bacteria
- 10 Photosynthetic Bacteria
- 11 Coli-aerogenes Group
- 12 Bacteroides
- 13 Cocci
- 14 Caryophanon
- 15 Sphaerotilus and Leptothrix
- 16 Caulobacter

T H E B A C T E R I A

Volume III

Part I: True Bacteria: Gram-Positive Groups

Chapter

- 1 Micrococcus and Sarcina
- 2 Lactic Acid Bacteria: Cocci
- 3 Lactic Acid Bacteria: Rods
- 4 Coryneform Bacteria
- 5 Propionic Acid Bacteria
- 6 Mycobacteria
- 7 Proactinomycetes
- 8 Streptomycetes
- 9 Micromonospora
- 10 Sporeformers: Cytology and Physiology of the Endospore
- 11 Sporeformers: Bacillus
- 12 Sporeformers: Clostridium

Part II: Gliding Bacteria

- 13 Myxobacteria
- 14 Filamentous Gliding Forms

Part III: Budding Bacteria

- 15 Hyphomicrobium and Rhodomicrobium

THE BACTERIA

A Treatise on Structure and Function

Scope and Purpose

The enclosed plan reflects our belief that a comprehensive and systematic account of the biology of bacteria would be of value both to students and to research workers. It is true that a succession of advanced textbooks and treatises have provided reasonably satisfactory syntheses of knowledge about the pathogenic bacteria over the past forty years; but during this period there has been no attempt at systematization of knowledge about the other bacterial groups.

We envisage a treatise in three volumes, (each of approximately six hundred pages). Volume I will deal with the general properties of bacteria, and will be divided into three sections concerned respectively with general physiology, with genetics, and with structure. The remaining two volumes will be devoted to detailed accounts of the individual groups of bacteria. For each group, we plan to include information on enrichment procedures, isolation, cultivation, special biochemical properties, and any special features of morphology and structure. Each chapter will conclude with a brief account of the more important species and a discussion of the role of the group in nature.

As a whole, the treatise would thus provide an up-to-date summary of the general biology of bacteria, together with large amounts of detailed information, now not readily available, on the special properties of the various component groups. It is clear that in order to keep this treatise within reasonable bounds some aspects of bacteriology must be excluded from consideration. For example, we do not plan to include sections dealing with host-parasite relations or with mechanisms of infection and resistance. Detailed consideration of industrial and agricultural applications will likewise be excluded. Although the main purpose of the treatise is not to provide an account of bacteriological methods, the principles of special methods essential to the study of particular groups of bacteria will be included.

September, 1955

I. C. Gunsalus
R. Y. Stanier